APPENDIX A: LIST OF COMMENTERS

COMMENTERS

DMC Stratex Networks Inc. (DMC)
Astrolink International LLC (Astrolink)
Satellite Industry Association (SIA)
Winstar Communications, Inc. (Winstar)
TRW Inc. (TRW)
The Boeing Company (Boeing)
Hughes Communications, Inc. (Hughes)
Wireless Communications Association International, Inc. (WCA)
Spectrum Astro, Inc. (Spectrum)
National Academy of Sciences Committee on Radio Frequencies (CORF)
Intelsat Global Services Corporation (Intelsat)
National Telecommunications and Information Administration (NTIA)

REPLY COMMENTERS

Advanced Radio Telecom Corp. (ART)
DCT Sprint, L.L C. (Sprint)
Bala Equity IV, Inc. (Bala IV)
PanAmSat Corporation, (PanAmSat)
Harris Corporation (Harris)
DCT Transmission, L.L.C (DCT)
Astrolink International LLC (Astrolink)
PVT Networks, Inc. (PVT)
Fixed Wireless Communications Coalition(R. D. Coles) (FWCC)
Wireless Communications Association International, Inc. (WCA)
The Boeing Company, (Boeing)
Hughes Communications, Inc. (Hughes)
Intelsat Global Service Corporation (Intelsat)
SkyTower, Inc., (Skytower)
AT&T Corp. (AT&T)
National Academy of Sciences' Committee on Radio Frequencies (CORF)
Winstar Communications, Inc. (Winstar)
TRW Inc. (TRW)
Satellite Industry Association (SIA)

APPENDIX B: FINAL RULES

Parts 2, 25, and 101 of title 47 of the Code of Federal Regulations are amended as follows:

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 76, 77, 78, and 79.

b. In the list of International footnotes under heading I, revise footnotes 5.340, 5.547, and 5.555A; add footnotes 5.516B, 5.551H, 5.551I, and 5 554A; and remove footnotes 5.551AA and 5.551G.

c. In the list of United States footnotes, add footnote US382.

d. In the list of Federal Government footnotes, revise footnote G117.

The revisions and additions read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5 149	36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263 US342		
37-37 5 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5 547	37-38 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	37-37 5 FIXED MOBILE	Fixed Microwave (101)
37 5-38 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5 547		37 5-38 6 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	Satellite Communications (25) Fixed Microwave (101)
38-39 5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547	38-38 6 FIXED MOBILE		
	38 6-39 5	38 6-39 5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175	
39 5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5 547	39 5-40 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US382 G117	39 5-40 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE NG175 US382	
40-40 5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5 516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)	40-40.5 EARTH EXPLORATION- SATELLITE (Earth-to-space) FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) G117	40-40 5 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE Mobile 5 547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5 516B BROADCASTING BROADCASTING- SATELLITE Mobile Mobile-satellite (space-to-Earth) 5 547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE Mobile 5 547	40 5-41 FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) US211 G117	40 5-41 FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE Fixed Mobile Mobile-satellite (space-to-Earth) US211	Satellite Communications (25)
41-42 5 FIXED FIXED-SATELLITE (space-to-Earth) 5 516B BROADCASTING BROADCASTING-SATELLITE Mobile			41-42.5	41-42 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE MOBILE US211	
				42-42 5 FIXED BROADCASTING BROADCASTING- SATELLITE MOBILE US211	Fixed Microwave (101)
5 547 5.551F 5 551H 5 551I			US211		
42 5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY 5 149 5 547			42 5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile RADIO ASTRONOMY US342	42.5-43 5 RADIO ASTRONOMY US342	
43 5-47 MOBILE 5 553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE			43.5-45 5 MOBILE-SATELLITE (Earth-to-space) FIXED-SATELLITE (Earth-to-space) G117	43 5-45 5	

		45 5-46 9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE 5.554		RF Devices (15)
5 554		46 9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE 5 554	46 9-47 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION- SATELLITE FIXED 5 554	
47-47 2 AMATEUR AMATEUR-SATELLITE		47-48 2	47-47 2 AMATEUR AMATEUR-SATELLITE	Amateur (97)
47 2-47 5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5 552A			47.2-48 2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264	Satellite Communications (25)
47 5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5 552 (space-to-Earth) 5 516B MOBILE	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5 552 MOBILE			
47 9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.552A				
48 2-48.54 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5 516B 5 554A 5 555A MOBILE	48 2-50 2 FIXED FIXED-SATELLITE (Earth-to-space) 5 516B 5.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE US264		
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE 5.149 5 340 5 555				
See next page	5 149 5 340 5 555	5 555 US342		

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
49 44-50 2 FIXED FIXED-SATELLITE (Earth-to-space) 5 552 (space-to-Earth) 5 516B 5 554A 5 555A MOBILE	See previous page for 48 2-50 2 GHz		See previous page for 48.2-50 2 GHz		See previous page for 47 2-50 2 GHz
50 2-50 4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5 340 5 555A			50 2-50 4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
50 4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Mobile-satellite (Earth-to-space)			50.4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) G117	50 4-51 4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space)	
51 4-52.6 FIXED MOBILE 5 547 5 556			51 4-52 6 FIXED MOBILE		
52 6-54 25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5 340 5 556			52.6-54 25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246		
54.25-55 78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 556A SPACE RESEARCH (passive) 5.556B			54.25-55 78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5 556A SPACE RESEARCH (passive)		
55.78-56 9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5 557			55.78-56 9 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US263 US353		
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5 558 SPACE RESEARCH (passive)			56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5.558	56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5 558 SPACE RESEARCH	

* * * * *

INTERNATIONAL FOOTNOTES

* * * * *

5.340 All emissions are prohibited in the following bands:

1400-1427 MHz,
2690-2700 MHz, except those provided for by No. 5.422,
10.68-10.7 GHz, except those provided for by No. 5 483,
15.35-15.4 GHz, except those provided for by No. 5.511,
23.6-24 GHz,
31.3-31.5 GHz,
31.5-31.8 GHz, in Region 2,
48.94-49.04 GHz, from airborne stations,
50.2-50.4 GHz[2],
52.6-54.25 GHz,
86-92 GHz,
100-102 GHz,
109.5-111.8 GHz,
114.25-116 GHz,
148.5-151.5 GHz,
164-167 GHz,
182-185 GHz,
190-191 8 GHz,
200-209 GHz,
226-231.5 GHz,
250-252 GHz.

[2] 5.340.1 The allocation to the earth exploration-satellite service (passive) and the space research service (passive) in the band 50 2-50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary services.

* * * * *

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service (HDFSS):

17 3-17.7 GHz (space-to-Earth) in Region 1
18.3-19.3 GHz (space-to-Earth) in Region 2
19.7-20.2 GHz (space-to-Earth) in all Regions
39.5-40 GHz (space-to-Earth) in Region 1
40-40.5 GHz (space-to-Earth) in all Regions
40.5-42 GHz (space-to-Earth) in Region 2
47.5-47.9 GHz (space-to-Earth) in Region 1
48.2-48.54 GHz (space-to-Earth) in Region 1
49.44-50.2 GHz (space-to-Earth) in Region 1
and
27.5-27.82 GHz (Earth-to-space) in Region 1
28.35-28.45 GHz (Earth-to-space) in Region 2
28.45-28.94 GHz (Earth-to-space) in all Regions
28.94-29.1 GHz (Earth-to-space) in Region 2 and 3

29.25-29.46 GHz (Earth-to-space) in Region 2
29.46-30 GHz (Earth-to-space) in all Regions
48.2-50.2 GHz (Earth-to-space) in Region 2

This identification does not preclude the use of these bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in these Regulations among users of the bands. Administrations should take this into account when considering regulatory provisions in relation to these bands. See Resolution 143 (WRC-03).

* * * * *

5 547 The bands 31.8-33 4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolutions 75 (WRC-2000) and 79 (WRC-2000)). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the bands 39.5-40 GHz and 40.5-42 GHz (see No. 5.516B), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate.

* * * * *

5.551H The equivalent power flux-density (epfd) produced in the band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service (space-to-Earth) operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

–230 dB(W/m^2) in 1 GHz and –246 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and
–209 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU-R S.1586 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θ_{min} of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:
- was in operation prior to 5 July 2003 and has been notified to the Radiocommunication Bureau before 4 January 2004, or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed.

5.551I The power flux-density in the band 42.5-43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service (space-to-Earth) operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:
–137 dB(W/m^2) in 1 GHz and –153 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and
–116 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:
- was in operation prior to 5 July 2003 and has been notified to the Radiocommunication Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed.

* * * * *

5.554A The use of the bands 47.5-47.9 GHz, 48.2-48.54 GHz and 49.44-50.2 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary satellites.

* * * * *

5.555A The power flux-density in the band 48.94-49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed -151.8 dB(W/m^2) in any 500 kHz band at the site of any radio astronomy station.

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

US382 In the band 39.5-40 GHz, Federal Government earth stations in the mobile-satellite service (space-to-Earth) shall not claim protection from non-Federal Government stations in the fixed and mobile services. ITU Radio Regulation No. 5.43A does not apply.

* * * * *

GOVERNMENT (G) FOOTNOTES

* * * * *

G117 In the bands 7.25-7.75 GHz, 7.9-8.4 GHz, 17.8-21.2 GHz, 30-31 GHz, 33-36 GHz, 39.5-41 GHz, 43.5-45.5 GHz and 50.4-51.4 GHz, the Government fixed-satellite and mobile-satellite services are limited to military systems.

* * * * *

PART 25 – SATELLITE COMMUNICATIONS

3. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies sec. 303, 47 U.S.C. 303. 47 U.S.C. sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

4. Section 25.202(a)(1) is revised to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

Section (a)(1), modify the table as follows:

(1) Add the following two entries to the bottom of the left-hand column as follows:

37.5-40[16, 17]
40-42[17]

(2) Change the last entry at the bottom of the right-hand column from "48.2-50.2" to "47.2-50.2."

(3) Add a superscript 1 to the new bottom entry in the right-hand column so that it reads "47.2-50.2[1]"

(4) Append the following two footnotes following the footnotes:

[16] Use of this band by the fixed-satellite service is limited to "gateway" earth station operations, provided the licensee under this Part obtains a license under Part 101 of this Chapter or an agreement from a Part 101 licensee for the area in which an earth station is to be located. Satellite earth station facilities in this band may not be ubiquitously deployed and may not be used to serve individual consumers.

[17] The band 37.5-40.0 GHz is designated as being available for use by the fixed and mobile services and the band 40.0-42.0 GHz is designated as being available for use by the fixed-satellite service.

5. Section 25.208 is amended by adding new paragraphs (p), (q), (r), (s) and (t) to read as follows:

§ 25.208 Power flux-density limits.

* * * * *

(p) In the band 37.5-40.0 GHz, the power flux-density at the Earth's surface produced by emissions from a geostationary space station for all methods of modulation shall not exceed the following values.

(1) This limit relates to the power flux-density which would be obtained under assumed free space conditions (that is, when no allowance is made for propogation impairments such as rain-fade).

-139 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-139 + 4/3 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 20 degrees above the horizontal plane; and

-119 + 0.4 (δ-20) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 20 and 25 degrees above the horizontal plane;

-117 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

(2) This limit relates to the maximum power flux-density which would be obtained anywhere on the surface of the Earth during periods when FSS system raises power to compensate for rain-fade conditions at the FSS Earth station:

-127 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-127 + 4/3 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 20 degrees above the horizontal plane; and

-107 + 0.4 (δ-20) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 20 and 25 degrees above the horizontal plane;

-105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

Note to Paragraph (p): The conditions under which satellites may exceed the power flux-density limits for normal free space propagation described in (1) to compensate for the effects of rain fading are under study and have therefore not yet been defined. Such conditions and the extent to which these limits can be exceeded will be the subject of a further rulemaking by the Commission on the satellite service rules.

(q) In the band 37.5-40.0 GHz, the power flux-density at the Earth's surface produced by emissions from a non-geostationary space station for all methods of modulation shall not exceed the following values:

(1) This limit relates to the power flux-density which would be obtained under assumed free space conditions (that is, when no allowance is made for propogation impairments such as rain-fade):

-132 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-132 + 0.75 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-117 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

(2) This limit relates to the maximum power flux-density which would be obtained anywhere on the surface of the Earth during periods when FSS system raises power to compensate for rain-fade conditions at the FSS Earth station:

-120 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-120 + 0.75 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

Note to Paragraph (q): The conditions under which satellites may exceed these power flux-density limits for normal free space propagation described in (1) to compensate for the effects of rain fading are under study and have therefore not yet been defined. Such conditions and the extent to which these limits can be exceeded will be the subject of a further rulemaking by the Commission on the satellite service rules.

(r) In the band 40.0- 40.5 GHz, the power flux-density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

-115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-115 + 0.5 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions.

(s) In the band 40.5-42.0 GHz, the power flux density at the Earth's surface produced by emissions from a non-geostationary space station for all conditions and for all methods of modulation shall not exceed the following values:

-115 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-115 + 0.5 (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and

-105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux density that would be obtained under assumed free-space propagation conditions.

(t) In the band 40.5-42.0 GHz, the power flux-density at the Earth's surface produced by emissions from a geostationary space station for all conditions and for all methods of modulation shall not exceed the following values.

-120 dB(W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-120 + (δ-5) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 5 and 15 degrees above the horizontal plane;

-110 + 0.5(δ-15) dB(W/m^2) in any 1 MHz band for angles of arrival δ (in degrees) between 15 and 25 degrees above the horizontal plane; and

-105 dB(W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;

These limits relate to the power flux-density that would be obtained under assumed free-space propagation conditions.

PART 101 – FIXED MICROWAVE SERVICES

6. The authority citation for part 101 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303.

7. Paragraph (a) of Section 101.147 is amended by deleting the entries for "38,600-40,000 MHz" and "Bands Above 40,000 MHz" and replacing them with the following entries and by adding new note 31 to read as follows:

§ 101.147 Frequency assignments.

(a) Frequencies in the following bands are available for assignment for fixed microwave services.

* * * * *

37,000-40,000 MHz (4)(32)
42,000-42,500 MHz

Notes

* * * * *

(32) Frequencies in this band are shared with stations in the fixed-satellite service, subject to the conditions specified in footnote 16 of Section 25.202(a)(1), *see* 47 C.F.R. § 25.202(a)(1) n.16.

* * * * *

APPENDIX C: FINAL REGULATORY FLEXIBILITY ACT ANALYSIS

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[207] an Initial Regulatory Flexibility Analysis (IRFA) was incorporated into the Further Notice of Proposed Rulemaking in IB Docket No. 97-95.[208] The Commission sought written public comment on the Proposals in the V-band Further Notice, including comment on the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.[209]

A. Need for and Objectives of the Proposed Rules

In this *Report and Order*, we modify the band segmentation plan governing operations in the 36.0-51.4 GHz band to reflect decisions reached at the 2000 World Radiocommunication Conference (WRC-2000) and the 2003 World Radiocommunication Conference (WRC-2003). The changes adopted in the domestic Table of Allocations seek to maximize efficient use of the radio spectrum by both satellite and terrestrial uses, with minimal changes to the existing Table. These changes will provide satellite and terrestrial operators, including small entity operators, with greater certainty about the scope of operations in this band, and should therefore provide benefits for small entity operators.

We make various designation and allocation changes in the 37.0 -42.0 GHz band to create two gigahertz of contiguous spectrum for both fixed satellite services and three gigahertz for terrestrial fixed wireless services. Specifically, we:

- Redesignate the spectrum available for wireless services from the 41.0-42.0 GHz band to the 37.6-38.6 GHz band, redesignate the spectrum available for satellite uses from the 37.6-38.6 GHz band to the 41.0-42.0 GHz band, and modify Parts 25 and 101 of our rules accordingly.

- Decline to adopt a Mobile-Satellite Service (MSS) designation in the 40.5-41.0 GHz band on a primary basis, and allocate MSS on a secondary basis in the 40.5-41.0 GHz band for Federal and non-Federal Government use.

- Add an additional 100 megahertz Fixed-Satellite Service (FSS) allocation in the 37.5-37.6 GHz band.

- Delete the non-Federal Government MSS allocation from the 39.5-40.0 GHz band and no longer require that non-Federal Government fixed and mobile operations protect Federal Government MSS earth stations in this band.

- Add a Government FSS allocation to the 40.5-41.0 GHz band, and require Government and commercial operators to coordinate their operations on a co-primary[210] basis.

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[207] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612., has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA). Pub. L No. 104-121, Title II, 110 Stat. 847 (1996).

[208] V-*band Further Notice*, 16 FCC Rcd at 12266-12270

[209] *See* 5 U.S.C. § 604

[210] A service that is primary is the only service given priority status to operate in a frequency band A service that is co-primary must share operations with other services specified as co-primary in the frequency band on a co-equal basis. A service that is secondary is allowed to use the band as long as its operations do not cause interference to any primary operations, and it must accept any interference caused by a primary service. If a (continued....)

- Adopt a primary non-Government FSS allocation in the 41.0-42.0 GHz band and modify the Table of Allocations in Section 2.106 of our rules accordingly.

- Maintain the current 47.2-48.2 GHz allocation for exclusive commercial use, and preserve the 42.5-43.5 GHz allocation for exclusive Government use (with the exception of Radio Astronomy operations).

- Incorporate into the Commission's rules PFD limits in the 37.5-40.0 GHz band that apply during normal (free-space, clear-sky) conditions and upper bound PFD limits that may apply during rain fade conditions.

- Adopt a description of "gateway" for earth stations licensed in the 37.5-40.0 GHz band.

B. Legal Basis

The proposed action is taken pursuant to Sections 1, 4(i), 301, 302, 303(e), 303(f), 303(g), 303(r), 304, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 301, 302, 303(e), 303(f), 303(g), 303(r), 304, and 307.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by proposed rules, if adopted.[211] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[212] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[213] A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).[214]

Geostationary and Non-Geostationary Orbit Fixed-Satellite Service Applicants and Licensees. Regarding future satellite use of the bands that are the subject of this rulemaking, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to Satellite Telecommunications. The definition provides that a small entity is one with $12.5

(Continued from previous page)
secondary service operation causes interference to a primary service, the secondary service provider must eliminate the interference or cease operations. *See generally* 47 C.F.R. § 2.105 (2002).

[211] 5 U.S.C. § 603(b)(3).

[212] 5 U.S.C. § 601(6).

[213] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

[214] Small Business Act, 15 U.S.C. § 632 (1996).

million or less in annual receipts.[215] According to 1997 Census Bureau data,[216] there are 273 satellite communication firms with annual receipts of under $10 million. In addition, 24 firms had receipts for that year of $10 million to $24,999,990.[217] Generally, these NGSO and GSO FSS systems cost several millions of dollars to construct and operate. Therefore the NGSO and GSO FSS companies, or their parent companies, rarely qualify under this definition as a small entity. In addition, the proposed rules may affect allocations for the space research (passive) and radio astronomy services. There are no small entities affected by this action because only Federal agencies currently make use of these services.

Terrestrial Fixed and Mobile Wireless Services. We note that the rules proposed in this order provide spectrum for future wireless and satellite licensees and the proposal would not affect any current non-Federal Government users. Regarding future terrestrial fixed and mobile use of the subject bands, the applicable definition of small entity is the definition under the SBA rules applicable to the Cellular and Other Wireless Telecommunications industry. This definition provides that a small entity is a firm employing no more than 1,500 persons.[218] The 1997 Census of Transportation, Communications, and Utilities, conducted by the Bureau of the Census, which is the most recent information available, shows that only 12 cellular and other wireless telecommunications firms out of a total of 1,238 such firms that operated during 1997 had 1,000 or more employees.[219] While we cannot at this time know precisely which entities will ultimately be utilizing all the subject spectrum, the following services are possibilities:

Fixed Microwave Services. Fixed microwave services include common carrier,[220] private operational-fixed,[221] and broadcast auxiliary radio services.[222] At present, there are approximately 22,015 common carrier fixed licensees and 61,670 private operations-fixed licensees and broadcast auxiliary radio licensees in the microwave services. The Commission has not created a size standard for a small

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[215] *See* 13 C.F.R. § 121.201 (2002), North American Industry Classification System (NAICS) 517410

[216] In 1997—the most recent year in which census data is available—the NAICS code for "Satellite Telecommunications" was 513340.

[217] U S Bureau of Census, U.S. Department of Commerce, 1997 Economic Census, EC97S51S-SZ, Subject Series, Establishment and Firm Size, Table 2, Employment Size of Establishments of Firms Subject to Federal Income Tax: 1997, NAICS Code 51740 (issued October 2000).

[218] *See* 13 C.F R. § 121.201 (2002), NAICS Code 513322 (changed to 517410 in October 2002).

[219] U.S. Bureau of the Census, U S. Department of Commerce, 1997 Economic Census, EC97551S-SZ, Subject Series, Establishment and Firm Size, Table 5, Employment Size of Firms: 1997, NAICS Code 513322 (issued October 2000).

[220] *See* 47 C.F R. §§ 101 *et seq.* (2002) (formerly part 21 of the Commission's Rules) for common carrier fixed microwave services (except Multipoint Distribution Service).

[221] Persons eligible under parts 80 and 90 of the Commission's rules can use Private Operational-Fixed Microwave services. *See* 47 C.F.R parts 80 and 90 (2002). Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee's commercial, industrial, or safety operations.

[222] Auxiliary Microwave Service is governed by part 74 of Title 47 of the Commission's rules. See 47 C.F.R part 74 *et seq* (2002) This service is available to licensees of broadcast stations and to broadcast and cable network entities Broadcast auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes mobile television pickups, which relay signals from a remote location back to the studio.

business specifically with respect to fixed microwave services. For purposes of this analysis, the Commission uses the SBA small business size standard for the category "Cellular and Other Telecommunications," which is 1,500 or fewer employees.[223] The Commission does not have data specifying the number of these licensees that have more than 1,500 employees, and thus are unable at this time to estimate with greater precision the number of fixed microwave service licensees that would qualify as small business concerns under the SBA's small business size standard. Consequently, the Commission estimates that there are 22,015 or fewer small common carrier fixed licensees and 61,670 licensees in the microwave services that may be affected by the rules and policies adopted herein. The Commission notes, however, that the common carrier microwave fixed licensee category includes some large entities.

39 GHz Service. The Commission created a special small business size standard for 39 GHz licenses – an entity that has average gross revenues of $40 million or less in the three previous calendar years.[224] An additional size standard for "very small businesses" is: an entity that, together with affiliates, has average gross revenues of not more than $15 million for the preceding three calendar years.[225] The SBA has approved these small business size standards.[226] The auction of the 2,173 39 GHz licenses began on April 12, 2000 and closed on May 8, 2000. The 18 bidders who claimed small business status won 849 licenses. Consequently, the Commission estimates that 18 or fewer 39 GHz licensees are small entities that may be affected by the rules and policies adopted herein.

Local Multipoint Distribution Service. The auction of the 1,030 Local Multipoint Distribution Service (LMDS) licenses began on February 18, 1998 and closed on March 25, 1998. The Commission established a small business size standard for LMDS licensees as an entity that has average gross revenues of less than $40 million in the three previous calendar years.[227] An additional small business size standard for "very small business" was added as an entity that, together with its affiliates, has average gross revenues of not more than $15 million for the preceding three calendar years.[228] The SBA approved these small business size standards in the context of LMDS auctions.[229] There were 93 winning bidders that qualified as small entities in the LMDS auctions. A total of 93 small and very small business bidders won approximately 277 A Block licenses and 387 B Block licenses. On March 27, 1999, the Commission re-auctioned 161 licenses; there were 40 winning bidders. Based on this information, we conclude that the number of small LMDS licenses will include the 93 winning bidders in the first auction and the 40 winning bidders in the re-auction, for a total of 133 small entity LMDS providers as defined by the SBA and the Commission's auction rules.

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[223] 13 C.F.R. § 121.201 (2002), NAICS code 513322 (changed to 517212 in October 2002).

[224] *See* Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands, ET Docket No. 95-183, *Report and Order*, 63 FR 6079 (February 6, 1998).

[225] *Id*

[226] *See* Letter to Kathleen O'Brien Ham, Chief, Auctions and Industry Analysis Division, Wireless Telecommunications Bureau, Federal Communications Commission, from Aida Alvarez, administrator, Small Business Administration (February 4, 1998)

[227] *See* Local Multipoint Distribution Service, *Second Report and Order*, 12 FCC Rcd 12545 (1997).

[228] *Id*

[229] *See* Letter to Dan Phythyon, Chief, Wireless Telecommunications Bureau, Federal Communications Commission, from A. Alvarez, Administrator, Small Business Administration (January 6, 1998).

D. Description of Projected Reporting, Recordkeeping and Other Compliance Requirements

None. These changes impose no cost or reporting burdens on fixed-satellite, mobile-satellite, or broadcasting-satellite service operators. No incumbents are affected by this proposed action. The only service rule changes proposed concern power flux density limits and frequency tolerance and emission limitations, which do not have associated compliance burdens

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.[230]

In this Report and Order, we modify the band segmentation plan governing operations in the 36.0-51.4 GHz band to reflect decisions reached at the 2000 World Radiocommunication Conference (WRC-2000) and the 2003 World Radiocommunication Conference (WRC-2003). These changes primarily attempt to settle allocation and segmentation issues and, as a result, provide similar benefits for all entities, including small. Specifically, the changes adopted in the domestic Table of Allocations seek to maximize efficient use of the radio spectrum by both satellite and terrestrial uses, with minimal changes to the existing Table. These changes will benefit all satellite and terrestrial operators by providing satellite and terrestrial operators, including small entity operators, with greater certainty about the scope of operations in this band.

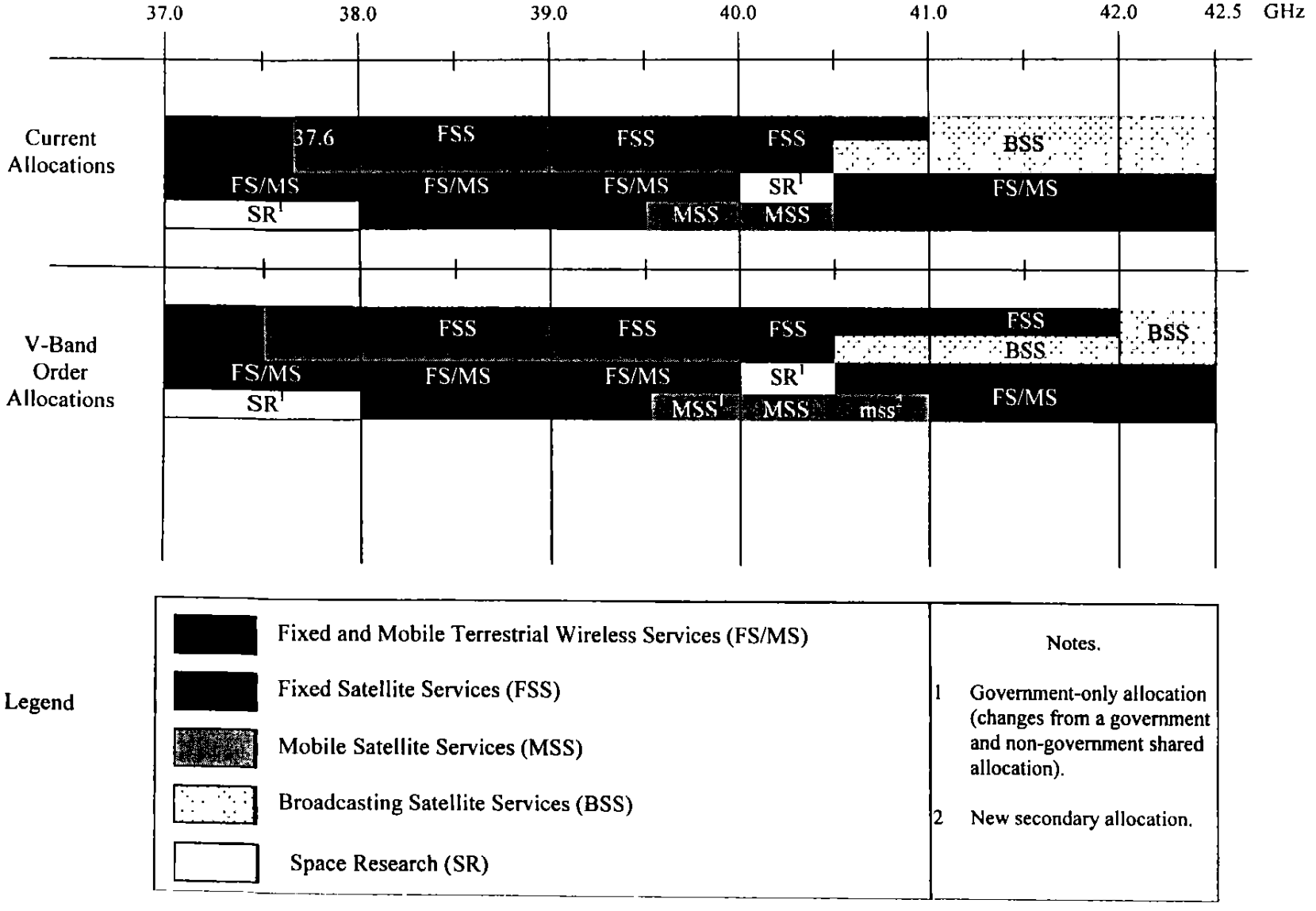
F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

None.

[230] *See* 5 U S C. § 603

APPENDIX D: CHART OF ALLOCATIONS AND DESIGNATIONS

V-Band Allocations (37.0 GHz-42.5 GHz)



APPENDIX D: CHART OF ALLOCATIONS AND DESIGNATIONS

Non-Government V-Band Designations